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Studies on the Bryophytes of Southern Manitoba.

II. Collections from the Winnipeg Area

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Abstract. Fifty-five taxa of bryophytes are reported for the area of Winnipeg, Manitoba. *Frullania inflata*, *Brachythecium acuminatum*, *Encalypta ciliata*, and *Tortella inclinata* are new records for the province.

Little work has been done on the bryophyte flora of Manitoba, and published work on the ecology of mosses and liverworts of the area lags far behind that for many other provinces. This is especially unfortunate as Manitoba lies in the transition zone of three major vegetation formations: the Boreal forest, the prairies, and the St. Lawrence-Great Lakes forest. It is consequently floristically rich and merits further study.

In recent years, Bird (1962, 1969) has recorded a number of bryophyte species from the prairies and the Aspen Parkland, including some collections from the Winnipeg area. Longton (1972) published 19 new records, mostly from the northern part of the province.

The present paper in which 55 species are recorded, is part of a series on the ecology and distribution of the bryophytes of southern Manitoba.

The area studied (49°43'-50°05' N, 97°00'-97°20' W) lies wholly within the Aspen Parkland (Bird 1961) and its forests are almost wholly deciduous. The nearest coniferous forests are at Birds Hill Provincial Park, 24 km NNE of the city. The bryophyte flora of this latter area will be the subject of other publications in this series (in preparation).

Most of the upland region in the Winnipeg area is occupied by aspen (*Populus tremuloides*)*-oak (*Quercus macrocarpa*) forest, while the valleys of the Red, Seine, Assiniboine,

and La Salle rivers are lined with floodplain forest dominated by green ash (*Fraxinus pennsylvanica*), Manitoba maple (*Acer negundo*), and elm (*Ulmus americana*), with basswood (*Tilia americana*) locally abundant.

Collections were made in eleven areas between June and August 1972, as follows.

1. North Kildonan Park, on clay and stones beside lake 8 km NNE of downtown Winnipeg.
2. La Barrière Park, in oak-aspen and floodplain forest along the La Salle river 16 km S of downtown Winnipeg.
3. St. Vital Park, in oak-elm-maple forest, merging into oak-aspen. On east bank of Red River, 6.4 km S of downtown Winnipeg.
4. Seine River bank at Marion Street. Ash-elm-maple forest with the understorey partly cleared.
5. Camp Manitou, 16 km W of downtown Winnipeg. Extensive areas of medium-aged — old deciduous forest in a bend of the Assiniboine River. Floristically the richest area, with moss abundant on deadfall and on live trunks.
6. Seine River bank in southeast Winnipeg, just N and S of Highway No. 1. Moss mostly on trunks of deciduous trees.
7. Assiniboine Park on south bank of Assiniboine River. Much of the area has been cleared, but extensive areas of only slightly disturbed forest of all types remain.
8. Very disturbed open grassland behind Cottonwood Village, 0.8 km N of Highway No. 1 and 2.4 km E of the Seine River.
9. Stony Mountain 0.8 km SE of the village of Stony Mountain, 24 km N of downtown Winnipeg. A large limestone outcrop, disturbed by quarrying. Dense *Salix* sp. shrubs on the west side, and a calcareous marsh on the northwest side.
10. Crescent Drive Park. Across the Red River from area 3, and with a similar type of forest.
11. Ash-elm-oak forest sloping rapidly to the river, on the south bank of the Assiniboine River just E of Assiniboine Park.

*Vascular nomenclature follows Scoggan 1957.

The numbers in brackets in the following list refer to the areas described above. Nomenclature of mosses follows Crum *et al.* (1965) with modification according to Crum (1971). Hepatic nomenclature follows Schuster (1953) with abbreviations of authorities modified to conform with the list given by Sayre *et al.* (1964).

Taxonomic and field work were shared equally by both authors. Voucher specimens have been deposited in the authors' own herbarium and at the University of Winnipeg.

When possible, several collections of the same species were made in each area, and the comments on substrates and associated species are based on careful observation of all collections made.

Hepaticae

Frullania inflata Gott. (5). Not previously recorded for the province. A single collection of this species in fruit was made 0.5 m above the ground on the south and east sides of an elm tree, where it was growing with *Pylaisiella polyantha* and *Brachythecium* sp. According to Schuster (1953) this species is not rare on bark in elm floodplain forests.

Marchantia polymorpha L. (1, 7, 8). Fairly common on soil in moist habitats in the area. Often with *Leptobryum pyriforme* or *Leptodictyum trichopodium* var. *kochii*.

Musci

Amblystegium juratzkanum Schimp. (2, 3, 4, 5, 9, 10, 11). Common on tree bases, with *Brachythecium salebrosum* and *Mnium cuspidatum*, but also found on silt and clay in floodplain forest with *Leptodictyum* spp. (2, 11).

Amblystegium serpens (Hedw.) B.S.G. (2, 3, 9, 11). In the same habitats as the preceding species but less often on silt.

Amblystegium varium (Hedw.) Lindb. (2, 3, 5, 9, 10). Frequent on rotten wood, or on moist clay (3), and often forming pure mats.

Anomodon minor (Hedw.) Fűrnr. (2, 3, 4, 10, 11). A characteristic species of tree bases in the area, occurring on all species except aspen, and sometimes extending up to 30 cm up the trunk in situations where moisture seems more abundant than usual. It is often associated with the basal *Mnium* and *Brachythecium* colonies and higher up the trunk with *Leskea* spp.

Brachythecium acuminatum (Hedw.) Rau and Herv. (2, 3, 5). Occupying the same niche as *B. salebrosum* on humus at tree bases. Sterile material was determined with difficulty in some cases. A new recording for the province.

Brachythecium campestre (C. Müll.) B.S.G. (3, 5). Usually on humus in drier areas. Several collec-

tions were in fruit and easily distinguished from *B. salebrosum* by the roughness of the upper parts of the seta.

Brachythecium collinum (Schleich. ex C. Müll.) B.S.G. (4, 5). A species of drier areas, both collections being made at dry, south-facing tree bases.

Brachythecium rutabulum (Hedw.) B.S.G. (2, 3, 5, 10). On moist humus, sometimes with *Mnium cuspidatum* and *Campylium hispidulum*, or on bottomland silt and clay with *Amblystegium* spp.

Brachythecium salebrosum (Web. and Mohr) B.S.G. (1, 2, 3, 5, 7, 9, 10, 11). The most widespread and commonest member of the genus, occurring in a wide variety of habitats but most frequent on humus and bases of trees of all species. Often associated with *Mnium cuspidatum* at tree bases, or with *Pylaisiella polyantha* higher up the trunks.

Bryum angustirete Kindb. ex Mac. (9). One collection made on dry gravelly soil.

Bryum argenteum Hedw. (7, 9). On dry, coarse soil (9) and in cracks in paving stones.

Bryum creberrimum Tayl. (2, 3, 5, 9). On humus, especially in drier open areas, where it is often mixed with *Ceratodon purpureus*. Widespread and common in the area.

Bryum pallescens Schleich. ex Schwaegr. (2). One collection only, at the base of an oak, on humus.

Bryum stenotrichum C. Müll. (9). Two collections, on humus, and on rotten wood with *Brachythecium salebrosum* and *Amblystegium varium*.

Callicladium haldanianum (Grev.) Crum (5, 11). Both collections on moist rotten wood, one with *Mnium cuspidatum*. Previously reported for the Winnipeg area by Bird (1969) and for the Spruce Woods area by Bird (1969) and by the authors¹.

Campylium chrysophyllum (Brid.) J. Lange (3, 9). On thick humus and rotten wood in moist habitats. Not common.

Campylium hispidulum (Brid.) Mitt. (2, 3, 5, 9). Common on tree bases, with *Amblystegium juratzkanum*, and on rotten wood with *Haplocladium microphyllum*.

Campylium stellatum (Hedw.) C. Jens. (8). One collection made with *Leptodictyum riparium* and *Drepanocladus aduncus* in a grassy area flooded in spring.

Ceratodon purpureus (Hedw.) Brid. (2, 3, 4, 5, 7, 9). A widespread and common species, occurring with a wide variety of associated species, notably *Bryum* spp. in dry habitats, and on a wide variety of substrates, ranging from clay and silty gravel (2, 3, 4) to such unusual substrates as a piece of polythene foam sponge with a little humus on it (3).

Climacium dendroides (Hedw.) Web. and Mohr (5). One collection, on humus and hardwood litter under oak.

Dicranella varia (Hedw.) Schimp. (9). Two collections, both on silt in the marshy area at this site.

Dicranella grevilleana (Brid.) Schimp. (3). One collection, on silty soil, with *Leptodictyum riparium*.

¹Stringer, M. H. L. and P. W. Stringer. Studies on the bryophytes of southern Manitoba. I. Collections from Spruce Woods Provincial Park. In preparation.

- Ditrichum flexicaule* (Schwaegr.) Hampe (9). In thick sods, on coarse, gravelly soil in cracks in the rock outcrop.
- Drepanocladus aduncus* (Hedw.) Warnst. (8). This wetland species was found only in grassland flooded in spring.
- Drepanocladus aduncus* (Hedw.) Warnst. var. *polycarpus* (Bland. ex Voit) Roth (3, 9, 12). More commonly found than the preceding, this variety was also collected in wet areas (e.g. marsh (9)), on humus or clay.
- Drepanocladus vernicosus* (Lindb. ex C. Hartm.) Warnst. (9). Found only as pure masses in the calcareous marsh at Stony Mountain.
- Encalypta ciliata* Hedw. (2, 3). Usually found on clay in dry areas. Not previously recorded for the province.
- Eurhynchium pulchellum* (Hedw.) Jenn. (2, 5). In pure mats, often on humus at tree bases.
- Funaria hygrometrica* Hedw. (1, 5, 7, 10). Common on ashes of old fires but also on clay (1). Frequently with *Leptobryum pyriforme* and *Bryum* spp.
- Grimmia apocarpa* Hedw. var. *conferta* (Funck) Spreng. (9). A saxicole, found twice on bare limestone.
- Haplocladium microphyllum* (Hedw.) Broth. (3, 5, 7, 9, 11). Common, especially in area 5, but confined to moist, well-rotted wood where its commonest associates were *Mnium cuspidatum* and *Leptodictyum trichopodium* var. *kochii*.
- Hypnum lindbergii* Mitt. (5). One collection, on black silt over rotten wood in a wet hollow with *Leptodictyum riparium*.
- Leptobryum pyriforme* (Hedw.) Wils. (1, 4, 5, 7). Common on a wide range of substrates but most frequently on clay or soil.
- Leptodictyum riparium* (Hedw.) Warnst. (2, 3, 4, 5, 11). Frequent on litter or silt and clay in wet habitats.
- Leptodictyum trichopodium* (Schultz) Warnst. var. *kochii* (B.S.G.) Broth. (1, 2, 3, 5, 7, 9, 11). Common especially on moist silt and clay, but also on rotten wood (1, 2, 3, 5) with *Haplocladium*.
- Leskea obscura* Hedw. (2, 3, 4, 10). Most frequently on bark near bases of live trees but persisting on bark on deadfall until decay is well advanced. Commonly associated with *Anomodon*, *Pylaisiella*, and *Orthotrichum* spp.
- Leskea polycarpa* (Hedw.) (2, 3, 4, 5, 7, 11). In the same habitats as, but more frequent than, the preceding species. The two species are distinguished with difficulty (Bird 1969), *L. polycarpa* having the more acute leaves.
- Leskeella nervosa* (Brid.) Loeske (9). Two collections made, with *Amblystegium juratzkanum*, *Mnium cuspidatum*, and *Brachythecium salebrosum*, on humus and twigs under willow shrubs.
- Mnium cuspidatum* Hedw. (2, 5, 9, 11). On humus, especially at tree bases, but also on rotten wood.
- Orthotrichum obtusifolium* Brid. (2). On bark of a live elm tree at the edge of a floodplain forest, with *Leskea obscura*.
- Orthotrichum pumilum* Sw. (2, 3, 10). On bark of live trees above basal stockings and often for several meters up the trunk. Especially common on poplar.
- Plagiomnium rugicum* (Laur.) Koponen (7). On wet, sandy soil with *Brachythecium salebrosum* and *Pohlia wahlenbergii*. Nomenclature follows Koponen (1971).
- Platygyrium repens* (Brid.) B.S.G. (2, 9, 11). On clay soil (2, 11) and limestone rock (9). Juvenile specimens were distinguished with difficulty from *Pylaisiella polyantha*.
- Pohlia wahlenbergii* (Web. and Mohr) Andr. (7). One collection, on wet, sandy soil at the edge of a pond.
- Pylaisiella polyantha* (Hedw.) Grout (2, 3, 5, 9, 10). A characteristic corticolous species, occurring above the basal *Mnium-Brachythecium* stockings but persisting for some time on deadfall, where it was found several times with *Haplocladium*.
- Rhynchostegiella compacta* (C. Müll.) Loeske (9). One collection, on twigs and litter under willow shrubs.
- Thuidium recognitum* (Hedw.) Lindb. (5). One collection, on loose humus and litter, under oak.
- Tortella fragilis* (Hook. ex Drum.) Limpr. (9). Common on coarse soil on the limestone outcrop.
- Tortella inclinata* (Hedw. f.) Limpr. (9). One collection, on thick humus over coarse, gravelly soil. Not previously recorded for the province.
- Tortella tortuosa* (Hedw.) Limpr. (9). Common in the same habitat as the preceding species.
- Tortula mucronifolia* Schwaegr. (2). One small collection, on bare soil in an oak wood, with *Encalypta ciliata*.
- Tortula ruralis* (Hedw.) Gaertn., Meyer and Scherb. (9). On coarse soil over limestone rock. Not common.
- Weissia controversa* Hedw. (9). On coarse soil in a crack in limestone rock. One collection only.

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